

CLAIMS

1. A radiation focussing element at least one surface of which is provided with at least one diffraction grating that is distorted substantially according to a quadratic function.
- 5 2. A focussing element according to claim 1 wherein the focussing element comprises a radiation reflector providing said surface.
3. A focussing element according to claim 1 wherein the focussing element comprises a radiation transmissive lens providing said surface.
4. A focussing element according to claim 3 wherein only one surface of the lens
10 is provided with a said grating.
5. A focussing element according to claim 3 or claim 4 wherein the dispersion inherent in the grating is reduced by the lens itself, or by one or more refractive element(s) thereof.
6. A focussing element according to any preceding claim wherein the grating is a
15 phase grating.
7. A focussing element according to any one of claims 1 to 5 wherein the grating is an amplitude grating.
8. A focussing element according to any one of claims 1 to 7 wherein the grating is provided in a layer covering at least part of said surface.
- 20 9. A focussing element according to claim 8 wherein said layer is made of a glassy composition.
10. A focussing element according to claim 7 and claim 8 wherein said layer is made of a radiation obscuring material.
11. A focussing element according to any one of claims 8 to 10 wherein said layer
25 is shaped.

12. A focussing element according to claim 2 wherein the reflector comprises a reflective layer on a substrate, and said reflective layer is shaped to provide said grating.
13. A focussing element according to any one of claims 1 to 6 wherein the grating is provided in the surface of the bulk element itself.
14. A focussing element according to any preceding claim and further comprising a mask on at least one surface of the element to provide an aperture.
15. A focussing element according to claim 14 wherein a said mask is provided in a layer on a surface of the focussing element.
16. A focussing element according to claim 14 or claim 15 wherein said mask and said grating are provided on the same surface of the focussing element.
17. A transmissive focussing element according to claim 14 or claim 15 wherein said mask and said grating are provided on the opposed surfaces of the focussing element.
18. A radiation focussing element according to any preceding claim for use with optical radiation.
19. A method of making an element according to any one of claims 11 to 13 wherein the grating is formed by embossing.
20. A method of making an optical element according to claim 11 or claim 12 wherein the grating is formed by selective etching.
21. A method of making an optical element according to claim 6 wherein the focussing element is a transmissive lens and the grating is formed by moulding during manufacture of the lens.
22. A three-dimensional imaging system comprising an element according to any one of claims 1 to 16.

23. A wavefront sensor comprising an optical element according to any one of claims 1 to 16.